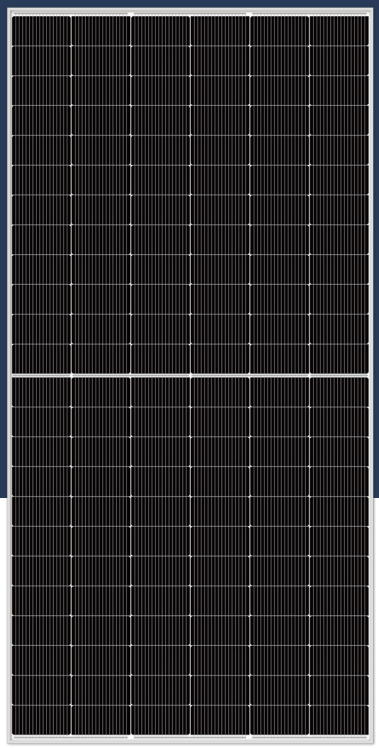
THORNOVA solar | TIER 1 BloombergNEF

# Tangra™ M Pro

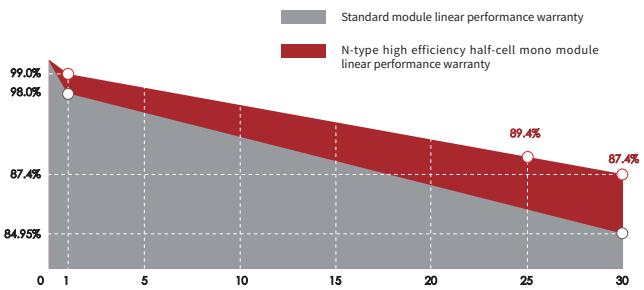
N-Type High efficiency Bifacial Dual Glass Module (Hail-Resistant)

## TS-BGT72(580-600)



- Bifacial technology allows for the harvesting of up to an additional 30% energy from the rear side of the module.
- 30 years lifespan brings 10-30% additional power generation comparing with conventional P-type module.
- N-type solar cell has no LID naturally which can increase power generation.
- Excellent low irradiance performance.
- Enhanced light trapping and optimized current collection contribute to the improvement of both module power output and reliability.
- Industry leading lowest thermal coefficient of power.
- Design optimized for lower operating current, resulting in minimized hot spot loss and improved temperature coefficient.
- Certified to withstand: wind load (2400 Pa) and snow load (5400 Pa).
- 100% triple EL test enables remarkable reduction of module hidden crack rate.

## LINEAR PERFORMANCE WARRANTY




**15** years
Product quality & process guarantee

**30** years
Linear power guarantee

**0.40** %
Annual degradation

## WARRANTY INSURANCE

Ariel Re | LLOYD'S Underwriters | Warranty partner Munich RE | 中国平安 PING AN P & C INSURANCE CO CN SZN

* Optional performance warranty insurance. Please contact our local sales staff for more information.

## COMPREHENSIVE CERTIFICATES

TÜV NORD | CE | INMETRO

**ISO 9001:** Quality Management System
**ISO 14001:** Environmental Management System Standard
**ISO 45001:** International Occupational Health and Safety Assessment System Standard
**SA8000:** 2014 Social Accountability Management System

* Different markets have different certification requirements.
Also, the products are under rapid innovation.
Please confirm the certification status with regional sales representatives.

## ELECTRICAL CHARACTERISTICS

144 cells

| Model of modules | TS-BGT72(580) | | TS-BGT72(585) | | TS-BGT72(590) | | TS-BGT72(595) | | TS-BGT72(600) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | STC | NMOT | STC | NMOT | STC | NMOT | STC | NMOT | STC | NMOT |
| Peak power - $P_{mp}$ (W) | 580 | 444 | 585 | 448 | 590 | 452 | 595 | 456 | 600 | 460 |
| Open circuit voltage - $V_{oc}$ (V) | 51.97 | 49.76 | 52.16 | 49.94 | 52.35 | 50.12 | 52.54 | 50.30 | 52.73 | 50.48 |
| Short circuit current - $I_{sc}$ (A) | 13.80 | 11.12 | 13.85 | 11.16 | 13.90 | 11.20 | 13.95 | 11.24 | 14.00 | 11.28 |
| MPP voltage - $V_{mp}$ (V) | 44.04 | 42.17 | 44.22 | 42.34 | 44.40 | 42.51 | 44.58 | 42.68 | 44.76 | 42.85 |
| MPP current - $I_{mp}$ (A) | 13.17 | 10.53 | 13.23 | 10.58 | 13.29 | 10.63 | 13.35 | 10.68 | 13.41 | 10.73 |
| Module efficiency - $\eta_m$ (%) | 22.5 | | 22.6 | | 22.8 | | 23.0 | | 23.2 | |

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25 ℃, Spectra at AM1.5
NMOT (Nominal Module Operating Temperature): Irradiance 800W/m², Ambient Temperature 20℃, Spectra at AM1.5, Wind at 1m/s

## ELECTRICAL CHARACTERISTICS WITH DIFFERENT POWER BIN (REFERENCE TO 13.5% IRRADIANCE RATIO)

| Peak power ($P_{max}$) (W) | 643 | 648 | 654 | 659 | 665 |
|---|---|---|---|---|---|
| Open circuit voltage ($V_{oc}$) (V) | 51.97 | 52.16 | 52.35 | 52.54 | 52.73 |
| Short circuit current ($I_{sc}$) (A) | 15.29 | 15.35 | 15.40 | 15.46 | 15.51 |
| MPP voltage — $V_{mp}$ (V) | 44.04 | 44.22 | 44.40 | 44.58 | 44.76 |
| MPP current — $I_{mp}$ (A) | 14.59 | 14.66 | 14.72 | 14.79 | 14.86 |

## STRUCTURAL CHARACTERISTICS

| Module dimensions (L*W*H) | 2278 x 1134 x 35 mm |
|---|---|
| Weight | 39.6 kg |
| Cell | 144 cells, N-type monocrystalline |
| Front glass | 3.2mm, anti-reflection coating |
| Back glass | 2.0mm, heat strengthened glass |
| Frame | Anodized aluminum alloy |
| Junction box | IP68, 3 bypass diodes |
| Output wire | 4.0 mm² |
| Wire length | 300mm/1200mm/customized length |
| Connector | MC4 Compatible |
| Packaging specification | 31 pcs/Pallet; 589 pcs/40'HQ |

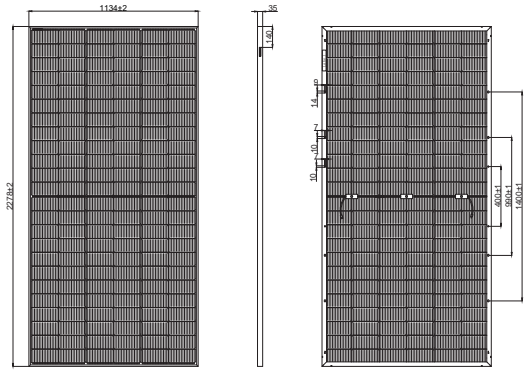
## OPERATING PARAMETERS

| Power tolerance (W) | (0,+5) |
|---|---|
| Maximum system voltage (V) | 1500 |
| Maximum rated fuse current (A) | 30 |
| Current operating temperature (°C) | -40~+85 °C |
| Mechanical load | 5400 Pa ❄/ 2400 Pa |
| Hailstone test (mm) | 55 |

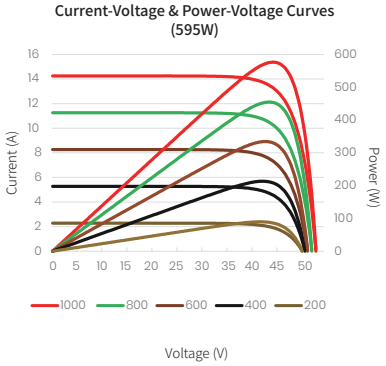
## TEMPERATURE PERFORMANCE RATINGS

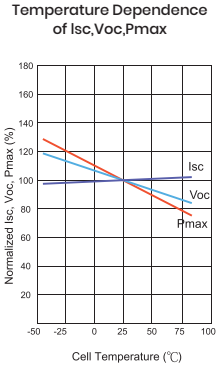
| Temperature coefficient ($P_{max}$) | -0.30 %/°C |
|---|---|
| Temperature coefficient ($V_{oc}$) | -0.28 %/°C |
| Temperature coefficient ($I_{sc}$) | +0.04 %/°C |
| Nominal Module Operating Temperature | 43±2 °C |

## MODULE DIMENSIONS (MM)




* The unmarked tolerance is ±1 mm
Length shown in mm

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